Space Weather Forecast

Issued on Tuesday, 22 November 2022 at 01:10 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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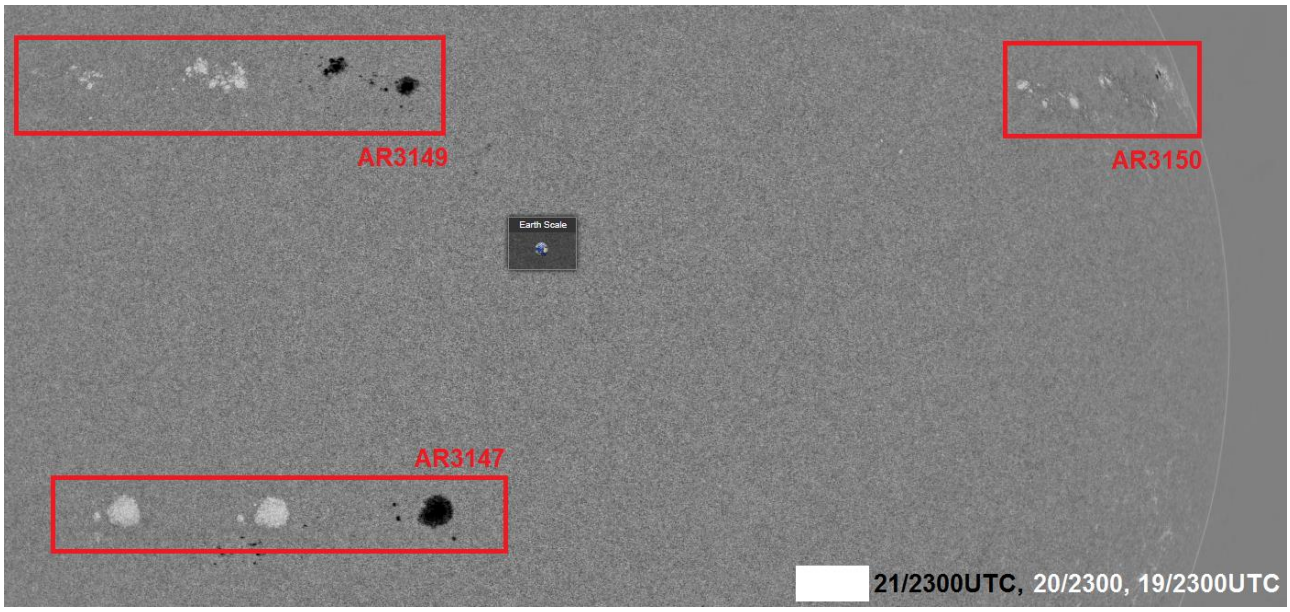
Space Weather Forecast Headline: Daily Slight Chance of Minor Geomagnetic Storms, perhaps reducing to end UTC working week.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low in the past 24 hours, with the largest X-ray flare of the period an isolated small common-class flare at 21/0348 UTC. This flare emanated from the largest and nominally most complex sunspot region on the Sun - in the northeastern quarter. The background X-ray flux otherwise showed a gradual reduction over the period.

The aforementioned group was one of up to five in total, with the previous holder of most active region now fading on the northwestern solar horizon and rotating out of view. All the other groups lay along a similar line of longitude narrowly in the eastern solar hemisphere and showed little activity of note.

Figure 1: Helioviewer.org-generated flase-colour visible difference imagery showing evolution in the three largest spot regions (with their assigned numbers) in 24-hour intervals over the last 48 hours. Also shown are the Earth and western solar horizon for scale.



A large 'prominence eruption' (an arc of plasma seen leaving the solar horizon) was seen from the northeast around 21/0200UTC, with this subsequently seen in satellite imagery but well off the Sun-Earth line. No Earth directed Coronal Mass Ejections (CMEs) were seen in available imagery.

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Solar Wind / Geomagnetic Activity: The solar wind was characteristic of connection to a weak fast wind regime. There are reasons to believe that Earth is skirting the very northern edge of the influence of the feature responsible, and that this has now peaked.

The solar wind speed was slightly elevated at peak as a result of the above, rising then falling through the 24 hours. The number of particles and their associated magnetic field were also slightly elevated at first, with both reducing back to typical background range with time. The north-south component of the field was variable, but peaked anti-aligned with Earth's early in the reporting period to give peak geomagnetic activity, however even this was comfortably below Minor Geomagnetic Storm G1.

Energetic Particles / Solar Radiation: No solar radiation storms were detected.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain low, with a daily slight chance of isolated moderate-class X-ray flares.

Solar Wind / Geomagnetic Activity: There is one CME in the forecast that may glance Earth between days one and two, Tuesday 22 and Wednesday 23 November. This is the large 'filament lift-off' (arc of plasma leaving the Sun) from 19 November.

The current fast wind is now thought to have peaked below forecast expectations, and should wane in earnest through day one. A slow regime should follow for a time, perhaps interrupted by the above CME before a second fast wind potentially arrives on day three, Thursday 24 November. A third fast wind due to follow this on day four by 27-day persistence is not expected until the UTC weekend.

The upshot of the above forecast is a daily slight chance of Minor Geomagnetic Storm G1 on days one to three (Tuesday to Thursday inclusive), probably falling to quiet on Friday 25 November, with this late quieter interlude of low confidence.

Energetic Particles / Solar Radiation: No solar radiation storms are expected given the dearth of significant sunspot regions on the Sun at present.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

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X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 M Class**	No	10	10	10	10
Very Active	**R3 to R5 X**	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	1	1	1	1
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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